EXHIBIT 8

Computer Desktop Encyclopedia

Ninth Edition

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Osborne/McGraw-Hill

New York Chicago San Francisco
Lisbon London Madrid Mexico City Milan
New Delhi San Juan Seoul Singapore Sydney Toronto

Osborne/McGraw-Hill
2600 Tenth Street
Berkeley, California 94710
U.S.A.

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Computer Desktop Encyclopedia, Ninth Edition

1234567890 DOC DOC 901987654321

Book p/n 0-07-219307-7 and CD p/n 0-07-219308-5
parts of
ISBN 0-07-219306-9

Publisher
Brandon A. Nordin

Vice President & Associate Publisher
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This book was composed with Corel VENTURA™ Publisher.

array processor A computer, or extension to its arithmetic unit, that is capable of performing simultaneous computations on elements of an array of data in some number of dimensions. Common uses include analysis of fluid dynamics and rotation of 3-D objects, as well as data retrieval, in which elements in a database are scanned simultaneously. See *vector processor* and *math coprocessor*.

arrow key One of four keyboard keys (up, down, left and right) that move the pointer, or cursor, on screen. See *cursor keys*.

Article 2B See *UCITA*.

artifact Some distortion of an image or sound caused by a limitation or malfunction in the graphics and sound hardware or software.

artificial intelligence See *AI*.

artificial language A language that has been predefined before it is ever used. Contrast with *natural language*.

artificial life An evolving computer science that models the behavior of biological systems. The models are used to study evolution as well as to apply the algorithms to a variety of problems in such fields as engineering, robotics and drug research.

AS (1) (Application System) An IBM mainframe 4GL that runs under MVS. It was originally designed for non-computer people and includes commands for planning, budgeting and graphics. However, a programmer can also produce complex applications. It also provides computer conferencing.

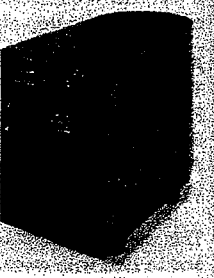
(2) See *autonomous system*.

AS/400 (Application System/400) An IBM minicomputer series introduced in 1988 that runs under the OS/400 operating system. It is IBM's midrange series of computer systems used primarily for business applications, most of which are written in RPG III and COBOL.

The AS/400 was designed to supersede the System/36 and System/38, IBM's prior midrange computers. The AS/400 is an enhanced version of the System/38, which includes an integrated relational database management system. Since System/38 programs can be run without change in the AS/400, System/38s were readily exchanged for AS/400s. However, in order to run System/36 applications, the programs have to be recompiled.

In 1994, IBM introduced the AS/400 Advanced System/36, a PowerPC-based version of the AS/400 that natively runs the System/36 SSP operating system and its applications.

The AS/400 serves in a variety of networking configurations: as a host or intermediate node to other AS/400s, as a remote system to mainframe-controlled networks and as a network server to PCs. In 2000, IBM changed the name of AS/400s to "iSeries eservers" (see *IBM server series*).



AS/400
The AS/400 is used in small to medium-sized businesses, and thousands of applications have been written for it.
(Image courtesy of International Business Machines Corporation. Unauthorized use not permitted.)

ascender The part of lowercase b, d, f, h, k, l, and t, that extends above the body of the letters. See *typeface*.

ascending sort Arranging data from the normal low to high sequence; for example, from A to Z or from 0 to 9. Contrast with *descending sort*.

ASCII (American Standard Code for Information Interchange) Pronounced "ask-ee." A binary code for text, as well as communications and printer control. It is used for most communications and is the built-in character code in most minicomputers and all personal computers.

ASCII is a 7-bit code providing 128 character combinations, the first 32 of which are control characters. Since the common storage unit is an 8-bit byte (256 combinations) and ASCII uses only 7 bits, the extra bit is used differently depending on the computer.

For example, the PC uses the additional values for foreign language and graphics symbols (see ASCII chart that follows). In the Macintosh, the additional values can be user-defined. See *ASCII chart* for a diagram of all the ASCII characters. See also *hex chart* and *Unicode*.

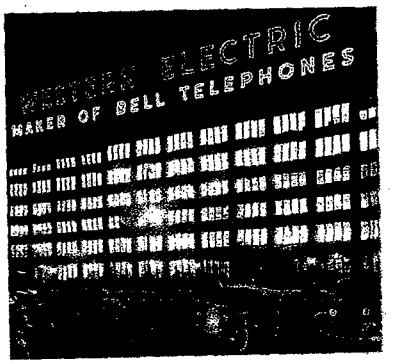
LU 6.2 An SNA protocol that establishes a session between two programs. It allows peer-to-peer communications, as well as interaction between programs running in the host with PCs, Macs and midrange computers.

Before LU 6.2, processing was done only in the mainframe. LU 6.2 allows processing to take place at both ends of the communications, necessary for today's distributed computing and client/server environment. See *APPC* and *CPI-C*.

Lucent (Lucent Technologies, Murray Hill, NJ, www.lucent.com) A major manufacturer of telecommunications equipment. Lucent makes telephones and telephone systems, large telephone switching computers and integrated circuits and optoelectronics components for communications and computer applications.

The company has a long history in the telecom arena. Its roots go back to 1869 when Elisha Gray and Enos Barton founded Gray and Barton in Cleveland, Ohio, a company that provided parts and models for inventors such as Gray himself. Gray and Barton was later renamed Western Electric Company when Western Union, its major customer, became an investor.

In 1881, American Bell Telephone purchased controlling interest in Western Electric, which became the manufacturing arm of the Bell companies. In 1899, AT&T, which was created 14 years earlier, took over American Bell and Western Electric. In 1925, the already-combined engineering departments of Western Electric and AT&T were turned into Bell Labs, which has become world famous for its research. A year later, Western Electric spun off its electrical distribution operations as Graybar Electric Company, which became the first large company to be bought out by its own employees.



Lucent Has History
Although a new company in 1996, Lucent goes way back, spawning Bell Labs and Graybar Electric, and inventing and/or developing some of the most important technologies in the western world. *(Image courtesy of Lucent Technologies.)*

Over the years, the company ushered in the electronic age by developing the vacuum tube. It also invented the loudspeaker, brought sound to motion pictures and introduced mobile communications, the forerunner of today's cellular system. When AT&T was divested of its Bell operating companies in 1984, Western Electric remained with AT&T, but was soon split up into a variety of divisions, including Network Systems, which builds the major switching and telecom equipment. When spun off from AT&T in 1996, Lucent retained all of AT&T's manufacturing units, as well as Bell Labs.

Luddite An individual that is against technological change. Luddite comes from Englishman Ned Lud, who rose up against his employer in the late 1700s. Subsequently, "Luddites" emerged in other companies to protest and even destroy new machinery that would put them out of a job. A neo-Luddite is a Luddite in the Internet age.

luggable A portable computer that weighs more than you want it to. This was said of many of the first portables such as Compaq's famous, first machine that weighed 30 pounds and catapulted the company to prosperity. Today, any laptop that weighs more than 10 pounds could be called a "luggable."

lumen A unit of measurement of the flow (rate of emission) of light. A wax candle generates 13 lumens; a 100 watt bulb generates 1,200. See *ANSI lumen* and *candela*.

luminance The amount of brightness, measured in lumens, that is given off by a pixel or area on a screen. It is the black/gray/white information in a video signal. Color information is transmitted as luminance (brightness) and chrominance (color). For example, dark red and bright red would have the same chrominance, but a different luminance. Bright red and bright green could have the same luminance, but would always have a different chrominance. See *YUV*.

LUN (Logical Unit Number) The physical number of a device in a daisy chain of drives. See *SCSI*.

LUNI See *LANE*.

lurk To view the interaction in a chat room or online forum without participating by typing in any comments. See *de-lurk*.

organizer See *PIM* and *PDA*.

orientation In typography, the direction of print across a page. See *portrait*.

origin server A Web server that contains the original Web page. The term is used to identify the Web server from the cache server. Since there is no physical difference between a digital original and a digital copy, the term implies that the origin server is the one that is maintained and updated by the enterprise. See *Web cache*.

orphan See *widow* and *orphan*.

orthogonal At right angles. The term is used to describe electronic signals that appear at 90 degree angles to each other. It is also widely used to describe conditions that are contradictory, or opposite, rather than in parallel or in sync with each other.

orthophotograph An aerial photograph in which the displacement of images has been removed and that has the distortion due to tilt, curvature, and ground relief corrected. It is a "scale corrected" aerial image, depicting ground features in their exact ground positions, in which distortion caused by camera and flight characteristics and relief displacement have been removed using photogrammetric techniques. (Data West Research Agency definition: see *GIS glossary*.)

OS See *operating system*.

OS 10 See *Mac OS X*.

OS/2 A family of multitasking operating systems for x86 machines from IBM. The client version is OS/2 Warp, and the server version is Warp Server for e-Business. There are add-ons to OS/2 that run DOS and Windows applications (see *Odin*). The server version includes advanced features such as the journaled file system (JFS) used in IBM's AIX operating system. OS/2 provides both a graphical user interface as well as a command line interface similar to DOS. See *OS/2 Warp* and *Warp Server*.

OS/2 is highly regarded as a robust operating system and, although it never became widely used, it is still strong in the banking industry, especially in Europe. In the U.S., many ATM machines run OS/2 due to it stability.

OS/2 provides a dual boot feature. When you turn the computer on, you can boot either OS/2 or DOS. Adobe Type Manager is included for rendering Type 1 fonts on screen and providing PostScript output on non-PostScript printers.

OS/2's Workplace Shell graphical user interface is similar to Windows and the Macintosh. Originally known as Presentation Manager (PM) before Version 2.0, the term still refers to the programming interface for writing GUI-based applications.

The first versions of OS/2 were single-user operating systems written for 286s that were jointly developed by IBM and Microsoft. Subsequent releases, starting with Version 2.0, were written for 32-bit 386s and up and are solely the product of IBM. Following is some of the evolution:

OS/2 16-bit Version 1.x The first versions (1.0, 1.1, etc.) were written for the 16-bit 286. DOS compatibility was limited to about 500K. Version 1.3 (OS/2 Lite) required 2MB RAM instead of 4MB and included Adobe Type Manager. IBM's Extended Edition version included Communications Manager and Database Manager.

OS/2 32-bit Version 2.x - IBM Introduced in April 1992, this 32-bit version for 386s from IBM multitasked DOS, Windows and OS/2 applications. Data could be shared between applications using the clipboard and between Windows and PM apps using the DDE protocol. Version 2.x provided each application with a 512MB virtual address space that allowed large tasks to be easily managed. Version 2.1 supported Windows' Enhanced Mode and applications could take full advantage of Windows 3.1. It also provided support for more video standards and CD-ROM drives. Communications and database management for OS/2 were provided by Communications Manager/2 (CM/2) and Database Manager/2 (DB2/2). CM/2 replaced Communications Manager, which was part of OS/2 2.0's Extended Services option.

OS/2 32-bit Version 3 - IBM In late 1994, IBM introduced Version 3 of OS/2, renaming it OS/2 Warp. The first version ran in only 4MB of memory and included a variety of applications, including Internet access.

Windows NT - Microsoft Originally to be named OS/2 Version 3.0, this 32-bit version from Microsoft was renamed "Windows NT" and introduced in 1993. See *Windows NT*.

OS/2 for Windows A special edition of OS/2 Version 2.1 for PCs that already have DOS and Windows 3.1 installed. It is less expensive than the full OS/2, because it does not include the Windows code. This was superseded by OS/2 Warp. See *OS/2*.

OS/2 PM (OS/2 Presentation Manager) The graphical user interface in OS/2 Version 1.x. It was later renamed Workplace Shell starting with Versions 2.0. See *OS/2*.

OS/2 Warp The client version of the OS/2 operating system. It includes peer-to-peer networking, fax and communications programs, multimedia viewing and editing applications and IBM Works (word processing, spreadsheet, database and other office tools).

Introduced in late 1994 as Version 3.0 of OS/2, it was the successor to OS/2 for Windows and OS/2 Version 2.1. When first introduced, it could run in 8MB of memory, which was important for its time.

There were originally two versions of OS/2 Warp. One required Windows 3.1 to be installed, the other included a modified version of Windows 3.1. See *OS/2*.

OS/2 Warp Connect The first version of OS/2 Warp to provide peer-to-peer networking to OS/2 and Windows machines. These networking functions were later added into the regular product line. See *OS/2*.

OS/360 The operating system for the IBM System/360, which was introduced in 1964. It was later released in two versions. OS/MFT (Multiple Fixed Transactions) supported multiple programs that used fixed memory regions, and OS/MVT (Multiple Variable Transactions) supported varying program sizes. OS/MFT and OS/MVT were later enhanced for virtual storage and became OS/VS1 and OS/VS2. OS/VS2 evolved into MVS.

OS/390 The primary operating system used in IBM mainframes. OS/390 was originally the MVS/ESA operating system renamed and repackaged in 1996 with an extensive set of utilities. Although the name MVS is still used to refer to the base control program of OS/390, enhancements in usability and workload balancing have made OS/390 stand apart from its MVS heritage. OS/390 is upward compatible from MVS/ESA 5.2.2, but downward compatibility is not ensured.

OS/400 The operating system designed for the AS/400 minicomputer from IBM.

OS/8 A single user, multitasking operating system from Digital for its PDP-8 computers. Variants run on DECstation and DECmate systems.

OS-9 A UNIX-like realtime operating system from Microware Systems Corporation, Des Moines, IA (www.microware.com), that is widely used in embedded systems such as pagers and cellular phones. OS-9 runs on Motorola 68000 and PowerPC CPUs. Originally developed for the 6809 chip, a version of OS-9 was created for CD-I players. See *DAVID*.

OS/9000 A portable version of OS-9, written in C, which runs on x86 and Motorola 68000 CPUs.

Osborne I The first portable computer, developed by Adam Osborne and introduced in 1981. Floppy disk based with 64K of memory, it used the CP/M operating system and a modified version of the WordStar word processor that would display only 40 characters at a time across its tiny 4.5" CRT. It cost $1,795, which was considerably inexpensive for a computer of that era. Weighing in at nearly 30 pounds and requiring AC power, the Osborne was really more "transportable" than a true portable.

oscillate To swing back and forth between the minimum and maximum values. An oscillation is one cycle, typically one complete wave in an alternating frequency.

oscillator An electronic circuit used to generate high-frequency pulses. See *crystal oscillator*, *VCO* and *clock*.

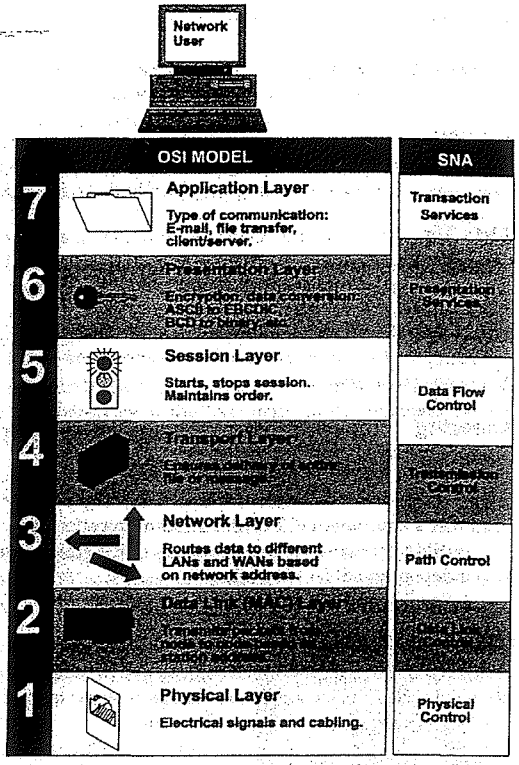
oscilloscope A test instrument that displays electronic signals (waves and pulses) on a screen. It creates its own time base against which signals can be measured, and displayed frames can be frozen for visual inspection.

SMTP (Simple Mail Transfer Protocol) The standard e-mail protocol on the Internet. It is a TCP/IP protocol that defines the message format and the message transfer agent (MTA), which stores and forwards the mail. SMTP was originally designed for only ASCII text, but MIME and other encoding methods enable program and multimedia files to be attached to e-mail messages.

SMTP servers route SMTP messages throughout the Internet to a mail server, such as POP3 or IMAP4, which provides a message store for incoming mail. See *POP3*, *IMAP* and *messaging system*. See also *SNMP*.

smurf attack An assault on a network that floods it with excessive messages in order to impede normal traffic. It is accomplished by sending ping requests (ICMP echo requests) to a broadcast address on the target network or an intermediate network. The return address is spoofed to the victim's address. Since a broadcast address is picked up by all nodes on the subnet, it functions like an amplifier, generating hundreds of responses from one request and eventually causing a traffic overload. See *denial of service attack* and *ICMP*.

SNA (Systems Network Architecture) IBM's mainframe network standards introduced in 1974. Originally a centralized architecture with a host computer controlling many terminals, enhancements, such as APPN and APPC (LU 6.2), have adapted SNA to today's peer-to-peer communications and distributed computing environment. Following are some of SNA's basic concepts.



Nodes and Data Links In SNA, nodes are end points or junctions, and data links are the pathways between them. Nodes are defined as Type 5 (hosts), Type 4 (communications controllers) and Type 2 (peripheral; terminals, PCs and midrange computers).

Type 2.0 nodes can communicate only with the host, and Type 2.1 nodes can communicate with other 2.1 nodes (peer-to-peer) without going to the host.

Data links include high-speed local channels, the SDLC data link protocol and Token Ring.

SSCPs, PUs and LUs The heart of a mainframe-based SNA network is the SSCP (System Services Control Point) software that resides in the host. It manages all resources in its domain.

Within all nodes of an SNA network, except for Type 2.1, there is PU (Physical Unit) software that manages node resources, such as data links, and controls the transmission of network management information. In Node Type 2.1, Control Point software performs these functions.

In order to communicate user data, a session path is created between two end points, or LUs (Logical Units). When a session takes place, an LU-LU session is established between an LU in the host (CICS, TSO, user appliction, etc.) and an LU in the terminal controller or PC.

An LU 6.2 session provides peer-to-peer communication and lets either side initiate the session.

VTAM and NCP VTAM (Virtual Telecommunications Access Method) resides in the host and contains the SSCP, the PU for the host, and establishes the LU sessions within the host.

NCP (Network Control Program) resides in the communications controller (front-end processor) and manages the routing and data link protocols, such as SDLC and Token Ring.

SNA Layers SNA is implemented in functional layers starting with the application that triggers the communications down to the bottom layers that transmit packets from station to station. This layering is called a "protocol stack."

The SNA stack is compared with the OSI model in the previous illustration. Although SNA had major influence on the OSI model, there are differences in implementation.

SNADS (SNA Distribution Services) An IBM messaging protocol used by IBM office automation products such as DISOSS and AS/400 Office. Various messaging gateways and messaging switches support SNADS.

snail mail Mail sent via the postal system.

snap-in A software module for the Microsoft Management Console (MMC) that provides administrative capabilities for a particular type of device. See *Microsoft Management Console*.

snapshot The saved current state of memory including the contents of all memory bytes, hardware registers and status indicators. It is periodically taken in order to restore the system in the event of failure.

snapshot dump A memory dump of selected portions of memory.

snapshot program A trace program that provides selected dumps of memory when specific instructions are executed or when certain conditions are met.

SNARC A network device from ITXC that moves telephone calls from a carrier's switch to and from the Internet. Connecting through a T1 or E1 port, the SNARC enables resellers and carriers to become Internet telephony service providers (ITSPs) via ITXC's network affiliations. See *ITXC*.

SND file (SouND file) One of several digital audio file formats that were created by Apple, NeXT and others. It typically refers to an uncompressed sound file used on the Macintosh. SND files use the .SND extension. In the Mac, digitized sounds can be stored as SND and AIFF files, or as resources in the resource fork.

sneakernet Carrying floppy disks, Zip disks, CD-Rs or some other removable recording medium from one machine to another to exchange information when there is no network in place.

sneezing To verbally tell somebody about a new and interesting Web site. See *viral marketing*.

Sneakernet
The way to transfer data in a workgroup when the network is down. It's a very reliable method.

SNI (1) (Subscriber Network Interface) The point of interface between the customer's equipment (CPE) and a communications service from a common carrier.
(2) (SNA Network Interconnection) Using a mainframe as a gateway between two independent SNA networks.
(3) See *Siemens Nixdorf*.

SNIA (Storage Networking Industry Association, Santa Barbara, CA, www.snia.org) An organization devoted to the advancement of mission critical storage systems. Founded in 1997, its goal is to determine the standards that must be developed to allow hosts and storage systems to interact via common protocols. SNIA was spearheaded by Strategic Research Corporation's Michael Peterson.

sniffer Software and/or hardware that analyzes traffic and detects bottlenecks and problems in a network.

snippet A small amount of something. In the computer field, it often refers to a small piece of program code.

SNMP (Simple Network Management Protocol) A widely-used network monitoring and control protocol. Data is passed from SNMP agents, which are hardware and/or software processes reporting activity in each network device (hub, router, bridge, etc.) to the workstation console used to oversee the network. The agents return information contained in a MIB (Management Information Base), which is a data structure that defines what is obtainable from the device and what can be controlled (turned off, on, etc.). Originating in the UNIX community, SNMP has become widely used on all major platforms.